Safe solid rocket design for small satellites

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Researchers at Los Alamos National Laboratory have developed a rocket motor concept that could pave the way for CubeSats zooming across space. These small, low-cost satellites are an easy way for scientists to access space, but are lacking in one key area, on-board propulsion.

“The National Academy of Sciences recently convened a meeting to look at science missions in CubeSats,” said Bryce Tappan, an explosives chemist at Los Alamos National Laboratory and lead researcher on the CubeSat Propulsion Concept team, “and identified propulsion as one of the primary categories of technology that needs to be developed.”

The Los Alamos team recently tested a six-motor CubeSat-compatible propulsion array with tremendous success. “I think we’re very close to being able to put this propulsion system onto a satellite for a simple demonstration of propulsion capability in space,” said Tappan.

The technology is called a “segregated fuel oxidizer” system where the solid fuel and solid oxidizer are kept completely separate inside the rocket assembly. Mixed fuel and oxidizer systems are much more common and significantly more unstable.

“Because the fuel and oxidizer are separate,” said Tappan, “it enables you to use higher-energy ingredients than you could use in a classic propellant architecture. This chemical propulsion mechanism produces very fast, high-velocity thrust, something not available with most electrical or compressed gas concepts.”